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Section B

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1 Lowther Gardens, Prince Consort Road, London S.W.7
(*Telephone*: KENsington 0048, 0049)

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PROCEEDINGS AT THE MEETINGS OF THE PHYSICAL SOCIETY

SESSION 1948–49

13*th October* 1948

Joint Science Meeting of THE COLOUR AND OPTICAL GROUPS, at Northampton Polytechnic, London E.C.1. Mr. J. G. Holmes was in the Chair.

The following papers were read and discussed :

" General Phenomena associated with Scattering of Light ", by E. W. H. Selwyn;

" Atmospheric Haze Factors : An Approximate Calculation of the Diffuse Reflection and Transmission of a Layer of Scattering Particles ", by W. S. Stiles;

" The Effect of Haze on Photography from the Air at Night ", by G. B. Harrison;

" Scattering of Light in Photographic Materials ", by D. T. R. Dighton;

" The Scattering and Absorption of Light in Coloured Paper ", by F. North.

14*th October* 1948

The ninth meeting of THE ACOUSTICS GROUP, at Imperial College, London S.W.7. Mr. H. L. Kirke was in the Chair.

The following paper was read and discussed :

" The Accuracy of Measurements by Rayleigh Disc ", by W. West.

25*th October* 1948

The sixteenth meeting of THE LOW TEMPERATURE GROUP, at the Science Museum, London S.W.7. Sir Charles Darwin was in the Chair.

The following paper was read and discussed :

" The Unattainability of Absolute Zero ", by F. E. Simon.

4*th November* 1948

The tenth meeting of THE ACOUSTICS GROUP, at the Royal Society of Arts, London W.C.2. Mr. H. L. Kirke was in the Chair.

A discussion was held on " Concert Hall Acoustics ".

H. Bagenal opened the discussion.

5*th November* 1948

Extraordinary General Meeting, at Imperial College, London S.W.7. The President, Professor G. I. Finch was in the Chair.,

The following special resolution was passed :

" That as from January 1949, or from such date as the Council may see fit, the *Proceedings of the Physical Society* shall be issued in two parts, which parts shall be entitled respectively *Proceedings of the Physical Society A* and *Proceedings of the Physical Society B* ; and further, that each Fellow and Student Member shall be entitled to receive either *Proceedings A* or *Proceedings B* (whichever he elects) on payment of the ordinary current subscription, and shall be entitled to receive both parts of the *Proceedings* on payment of an additional annual subscription not exceeding the current Fellowship subscription, the exact amount to be determined by the Council in accordance with the Articles of Association of the Physical Society.

5th November 1948

Science Meeting, at Imperial College, London S.W.7. The President, Professor G. I. Finch, was in the Chair.

The following were elected to Fellowship, the first two being transferred from Student Membership: David Noel Ferguson Dunbar, Peter Ewart Watson, Maurice Evan Bell, Charles Alexander Cochrane, Sheila Marion Crawford, Frederick Paulinus Cunningham, Gerard Field, Louis Jacob, Dominic Johnston, George Guy Macfarlane, Harrie Stewart Wilson Massey, Archibald George Peacock, Cyril George Wilson, J. G. Raynor Young.

The following papers were read and discussed:

"The Scattering of Fast Beta-Particles through Large Angles by Nitrogen Nuclei", by F. C. Champion and R. R. Roy;

"Beta Disintegration and Sargent Diagram", by N. Feather and H. O. W. Richardson;

"Investigations using a Permanent Magnet Double Beta-Ray Spectrograph with Coincidence Counting", by N. Feather, J. Kyles and R. W. Pringle.

10*th November* 1948

The forty-second meeting of THE COLOUR GROUP, at the Lighting Service Bureau, London W.C.2. Dr. W. D. Wright was in the Chair.

The following papers were read and discussed:

"Measurement, Representation and Specification of Colour and Colour-rendering Properties of Light Sources", by G. T. Winch and H. R. Ruff;

"Fluorescent Lamp Artificial Daylight Units for Colour Matching", by G. T. Winch, W. Harrison and H. R. Ruff.

An informal report was given on the meeting of the Commission Internationale de l'Eclairage in Paris, July 1948, by members of the Colour Group who attended.

25*th November* 1948

The seventeenth meeting of THE LOW TEMPERATURE GROUP, at the Science Museum, London S.W.7. Sir Charles Darwin was in the Chair.

A lecture was given entitled "Irreversible Processes in Liquid Helium II", by Professor C. J. Gorter.

25*th November* 1948

The eleventh meeting of THE ACOUSTICS GROUP, at Imperial College, London S.W.7. Mr. H. L. Kirke was in the Chair.

The following paper was read and discussed:

"Apparatus for Acoustical Measurements at Low Frequencies", by R. S. Dadson and E. G. Butcher.

3*rd December* 1948

Extraordinary General Meeting, at Imperial College, London S.W.7. The President, Professor G. I. Finch, was in the Chair.

The following special resolution was passed:

"That Article 44 of the Articles of Association of the Society be altered as follows:—Student Members shall be entitled to a copy of all publications issued by the Society upon such terms as the Council or a General Meeting of the Society may from time to time fix."

3*rd December* 1948

Science Meeting, at Imperial College, London S.W.7. The President, Professor G. I. Finch, was in the Chair.

It was announced that Council had elected the following to Student Membership: Peter John Cott, John Joseph Florentin, William Peter McKinney, Eric Shuttleworth, Donald Wesley Willis, Ronald Drayton Brown, Michael Onslow Bryant, Desmond Malone Burns, Ugo Camerini, Richard Hapgood Campbell, Peter Francis Chester, John Oswald Cope, Brian Arthur Evans, Cecil Bentley-Innes Glass, Stanley Hope, David John Ingram, Charles Hennie James Johnson, Aaron Klug, William Owen Lock, Ronald W. Maxwell, Hugh Muirhead, William Paterson Forsyth Raffan, Leonore Ritter, Michael Ian Scott.

The following were elected to Fellowship, the first-named being transferred from Student Membership: Raymond Jeffrey Slaughter, Mohammed Kashif Al-Ghita, Stanley Edgar Barden, Christopher Frederic Bareford, Albert Edward De Barr, David Robert Bates, Fathi Ahmed el Bedewi, Isaac Israel Berenblut, Arthur Cunliffe, A. Van Itterbeek, Max Krook, John Stewart Marshall, Bernard Wheeler Robinson.

The following papers were read and discussed:

" Refractive Index in Electron Optics and the Principle of Dynamics ", by W. Ehrenberg and R. E. Siday;

" Measured Properties of Strong ' Unipotential ' Electron Lenses ", by G. Liebmann.

8*th December* 1948

The forty-third meeting of The Colour Group, at Imperial College, London S.W.7. Mr. J. G. Holmes was in the Chair.

The following papers were read and discussed:

" The Scotopic Visibility Function ", by B. H. Crawford;

" Visual Purple and the Photopic Luminosity Curve ", by H. J. A. Dartnall.

9*th December* 1948

Science Meeting, at the Laboratories of Metropolitan-Vickers Electrical Co., Trafford Park, Manchester. The President, Professor G. I. Finch, was in the Chair.

The following papers were read and discussed:

" The Structure of Electro-Deposits ", by G. I. Finch;

" Observations on Electrical Behaviour of Silicon Carbide Contacts ", by E. W. J. Mitchell and R. W. Sillars;

" Structure and Electrical Properties of Surfaces of Semiconductors—Part I: Silicon Carbide ", by T. J. Jones, R. A. Scott and R. W. Sillars;

" Some Experiences in the Application of the Electron Microscope to the Study of Steels ", by J. Trotter and F. W. Cuckow;

" The Structure and Epitaxy of Lead Chloride Deposits formed from Lead Sulphide and Sodium Chloride ", by A. J. Elleman and H. Wilman.

16*th December* 1948

The twelfth meeting of The Acoustics Group, at Imperial College, London S.W.7. Mr. H. L. Kirke was in the Chair.

The following paper was read and discussed:

" Jet-propelled Aircraft Noise ", by S. C. Ghose.

17*th December* 1948

The thirty-fourth meeting of The Optical Group, at the Institute of Physics, London S.W.1. Professor L. C. Martin was in the Chair.

The following papers were read:

" On the Theory of Aplanatic Aspheric Systems ", by E. Wolf and G. D. Wassermann;

" A General Method for the Calculation of the Chromatic Variation of Lens Aberrations " by H. H. Hopkins.

17*th December* 1948

The third Annual General Meeting of THE LOW TEMPERATURE GROUP, at the Science Museum, London S.W.7. Sir Charles Darwin was in the Chair.

The Minutes of the Second Annual General Meeting were read and confirmed.

The Report of the Committee for 1948 was presented.

The Officers and Committee for 1949 were elected.

Auditors were elected for the Special Fund.

The retiring President addressed the meeting.

Votes of thanks were recorded to the retiring Chairman and members of the Committee.

17*th December* 1948

The eighteenth meeting of THE LOW TEMPERATURE GROUP, at the Science Museum, London S.W.7. Sir Charles Darwin was in the Chair.

A discussion was held on "The Use of Thermodynamics Diagrams in Industry". The subject was introduced by Professor D. M. Newitt.

14*th January* 1949

Science Meeting, at Imperial College, London S.W.7. The President, Professor G. I. Finch, was in the Chair.

It was announced that Council had elected the following to Student Membership: Jack Blitz, Brian Irvine Callin, John Anthony Champion, Robert Derek Craig, Gordon Arthur Dale, Cyril Henry Dix, Hector William Emerton, Donald Charles Field, Bernard Frank Figgins, Roy Sidney Gibbons, Donald Henry Grover, Raymond Frederick Hall, Leslie Jeffrey Hastewell, John Frank Hills, Walter Hopwood, John Arthur Hulbert, Arthur Langridge, Geoffrey Albert Lawrence, Albert John Manuel, Douglas Leonard Martin, Colyn Grey Morgan, Basil Leslie Morton, Edmund Gerard Muirhead, Frank Donald Stacey, Anthony Victor Stockley, John Thraves, Gerald Anthony Williams, John Francis Williams, Ronald John Wilson, Alan Neal Durham Young.

The following were elected to Fellowship, the first six being transferred from Student Membership: Patrick Bomyer, Sylvia Mary Gumbrell, Peter Donald Lomer, Lloyd Julian Perper, Michael Somerset Ridout, Krishnarao Govindarao Torgal, James Brooking Brown, Klaus Fuchs, Alfred Claude Jessup, John Moffatt, Frank Dudley Stott, James Harold Thorp, John Samuel Thorp, John Wilson.

The following papers were read and discussed:

"Travelling Wave Linear Accelerators", by R. B. R.-Shersby-Harvie;

"Theoretical Design of Linear Accelerators for Electrons", by W. Walkinshaw;

"Experimental Work on Corrugated Waveguides and Associated Components for Linear Electron Accelerators". by L. B. Mullett and B. G. Loach.

26*th January* 1949

The thirteenth meeting of THE ACOUSTICS GROUP, at the Institution of Electrical Engineers, London W.C.2. Mr. H. L. Kirke was in the Chair.

A demonstration was given on "The Development of Magnetic Tape Recorders", by B. E. G. Mittell.

The meeting was held jointly with the Radio Section of the Institution of Electrical Engineers.

4*th February* 1949

Science Meeting, at University College, London W.C.1. The President, Professor G. I. Finch, was in the Chair.

It was announced that Council had elected the following to Student Membership: Herbert Colin Bate, Alan E. Beck, Dennis Walter Bird, Walter Ernest Booth, James Graham Brown, Clifford Harry Champness, John Albert Chapman, David Michael Danziger,

Mehmet Yusuf Dizioğlu, Kenneth Thomas Dolder, Arthur James Dyer, Roland Ernest Ford, Clifford Gregory, Dorothy Joyce Harrington, Benjamin Peter Howorth, David William Shaper Limbert, Max Lipsicas-Lipschitz, John Morgan, Eric Norman-Wilson, John Osborne, Alexander Tudor Pomeroy, John Samuel Pyett, Robert Shannon, Roman Stefan Sidorowicz, Alan Smith.

The following papers were read and discussed :

" A Projection Model to Illustrate Crystal Structure with Surfaces of Misfit ", by E. N. da C. Andrade;

" The Mechanism of Dilatancy ", by E. N. da C. Andrade and J. W. Fox;

" The Effect of Pre-Strain on the Character of the Creep of Lead ", by E. N. da C. Andrade and A. J. Kennedy;

" The Thermal Etching of Single Crystals of Cadmium ", by E. N. da C. Andrade and R. F. Y. Randall;

" Viscosity and Density in the Supercooled Liquid State ", by C. Dodd and Hu Pak Mi.

12*th February* 1949

The forty-fourth meeting of THE COLOUR GROUP, held jointly with the BRITISH PSYCHOLOGICAL SOCIETY, at Tavistock House, London W.C.1. Mr. J. G. Holmes was in the Chair.

A discussion was held on the techniques and methods of interpretation of experiments in colour as carried out by physicists, physiologists and psychologists. The discussion was introduced by W. A. Allen, R. C. Oldfield, R. W. Pickford, L. C. Thomson and W. D. Wright.

18*th February* 1949

The fourteenth meeting of THE ACOUSTICS GROUP, at Imperial College, London S.W.7. Mr. H. L. Kirke was in the Chair.

A discussion was held on the subject of " Applications of Ultrasonics ". Mr. G. Bradfield opened the discussion.

19*th February* 1949

Science Meeting, at Edinburgh University. The President, Professor G. I. Finch, was in the Chair.

The following papers were read and discussed :

" Experimental Tests of a Wide-Angle Beta-Particle Spectrometer using an approximately Prolate Spheroidal Magnetic Field ", by T. H. Braid and H. O. W. Richardson;

" Tests of a Prism Spectrograph of High Resolving Power ", by R. E. Siday and D. A. Silverston;

" An Emission Microscope for Photoelectron Autoradiography ", by (Miss) A. N. Barker, N. Feather and H. O. W. Richardson;

" The Use of Proportional Counters to Investigate Beta-Disintegration ", by S. C. Curran;

" Electrons as Nuclear Projectiles ", by B. Touschek;

" A new Approach to the Theory of Elementary Particles ", by M. Born and H. S. Green;

" Film Transport in Liquid Helium II ", by J. F. Allen;

" A new Photoelectric Amplifier ", by R. V. Jones;

" Long-Range Molecular Forces ", by J. Iball.

24*th February* 1949

The nineteenth meeting of THE LOW TEMPERATURE GROUP, at the Geological Society, London W.1. The meeting was held jointly with the Institution of Chemical Engineers. Professor F. E. Simon was in the Chair.

A Lecture was given on " Materials of Construction for use at Low Temperatures ", by E. W. Colbeck.

11*th March* 1949

Science Meeting, at the Science Museum, London S.W.7. The President, Professor G. I. Finch, was in the Chair.

It was announced that Council had elected the following to Student Membership: Herbert Roy Barnes, Clive Keith Coogan, Jack Dutton, Arthur Abraham Fröhlich, Brian Leonard Hart, Peter Arthur Lee, Colin Douglas McKenzie, Richard Leonard Mason, John Barlow Massey, Maurice George Mylroi, John Robert Pattison, Colin John Swanson, Peter Guy Towlson, Alan Reginald Watson, Donald Percy Dennis Webb, Kenneth Worthington.

The following were elected to Fellowship, the first thirteen being transferred from Student Membership: Edward Walter Bastin, Raymond Bowers, Richard Arthur Brown, Francis Maurice Comerford, Christian Ellis Coulman, James William Crawford, Robert Tudor Jarman, George Harry King, Eric Walter Lee, Charles Walter Morley, Michael William Ovenden, John Alexander Pryde, Geoffrey Cecil Pyle, Stanley Sumner Ballard, Max Born, Edward Colin Cherry, Claude Le Cointe, Ralph Forder Denington, Adam Wincety Gac, Hylton Judith Grenville-Wells, Arthur Ap Gwynn, Gordon Edward Hughes, Cecil Newton Kington, Anne Hutton Numbers, David Luther Phillips, Horace Hewitt Poole, Otto Pressel, Alec Radcliffe, Marion Amelia Spence Ross.

The following papers were read and discussed:

" Temperature Measurements of Flames containing Incandescent Particles ", by H. G. Wolfhard and W. G. Parker;

" A new Technique for the Spectroscopic Examination of Diffusion Flames at Normal Pressures ", by H. G. Wolfhard and W. G. Parker.

18*th March* 1949

The Second Annual General Meeting of THE ACOUSTICS GROUP, at the Royal Society of Arts, London W.C.2. Mr. H. L. Kirke was in the Chair.

The Minutes of the First Annual General Meeting were read and confirmed.

The Report of the Committee for 1948–49 was presented.

A proposal to make some alterations and additions to the Regulations of the Group was approved.

The Officers and Committee for 1949–50 were elected.

18*th March* 1949

The fifteenth meeting of THE ACOUSTICS GROUP, at the Royal Society of Arts, London W.C.2. Mr. H. L. Kirke was in the Chair.

The following paper was read and discussed:

" The Acoustics of Bells ", by Ir. E. W. van Heuven.

21*st March* 1949

Celebration of the Seventy-fifth Anniversary of the Foundation of THE PHYSICAL SOCIETY.

The thirty-third Guthrie lecture was delivered at the Royal Institution, London W.1. by Professor A. O. Rankine. His subject was " Experimental Studies in Thermal Convection ".

During the evening a Conversazione was held at the Rooms of the Royal Society.

23rd March 1949

The twentieth meeting of THE LOW TEMPERATURE GROUP, at the works of Messrs. Petrocarbon Ltd., Eccles, Manchester. Professor F. E. Simon was in the Chair.

An introductory lecture was given outlining the scope of the works snd describing the low temperature plant. The pilot plant and the works were then inspected.

24th March 1949

The thirty-fifth meeting of THE OPTICAL GROUP, at Imperial College, London S.W.7. Professor L. C. Martin was in the Chair.

The following papers were read and demonstrations given :

" The Design of a Class of Variable Power Systems ", by H. H. Hopkins. The demonstration was given of a system with 2-inch aperture and 30-degree field for use with television cameras;

" German Infantry Range-finders ", by E. Wilson.

30th March 1949

The ninth Annual General Meeting of THE COLOUR GROUP, at the Royal Photographic Society's rooms, London S.W.7. Mr. J. G. Holmes was in the Chair.

The Minutes of the eighth Annual General Meeting were read and confirmed.

The Report of the Committee for 1948–49 was presented.

The Officers and Committee for 1949–50 were elected.

A vote of thanks was given to retiring Committee Members.

30th March 1949

The forty-fifth meeting of THE COLOUR GROUP, at the Royal Photographic Society's rooms, London S.W.7. Dr. W. S. Stiles was in the Chair.

A discussion was held on Photoelectric Spectrophotometers and Tricolorimeters. The discussion was introduced by T. Vickerstaff.

The new Hilger Uvispek photoelectric spectrophotometer was demonstrated by Messrs. Hilger and Watts Ltd.

22nd April 1949

The sixteenth meeting of THE ACOUSTICS GROUP, at the National Hospital, London W.C.1.

The following paper was read and discussed :

" The Theory of Hearing ", by T. Gold and R. J. Pumphrey.

22nd April 1949

Science Meeting, at the Science Museum, London S.W.7. The President, Professor G. I. Finch, was in the Chair.

It was announced that Council had elected the following to Student Membership : Max Theodore Christensen, Alan Derek Harold Cripps, Francis Peter Edmund Gardner, Bernard Lionel Ginsborg, Henry Ralph Harman, Harvey Douglas Keith, Alan Bernard Lidiard, John Langley Rogers, Alfred Philip Tatt, Alan Teviotdale, Bernard John West.

The following were elected to Fellowship, the first-named being transferred from Student Membership : Werner Freitag, Henry Ian Allgood, Frank Foster Evison, Richard L. Extermann, Arthur J. Good, Pierre A. Grivet, Arnold Charles Lynch, Ian Mackay, Roy Middleton, Velimir Vook.

The twenty-fifth Duddell Lecture was delivered by Professor K. M. G. Siegbahn (Nobel Institute for Physics, Stockholm), whose subject was " On Gratings ".

27*th April* 1949

The twenty-first meeting of THE LOW TEMPERATURE GROUP, was held at the Laboratories of the British Oxygen Company, Morden, London S.W.19. Professor F. E. Simon was in the Chair.

An introductory lecture was given by P. H. Sykes. The work of the Development and Research Sections was outlined by P. M. Schuftan and A. M. Clark.

The laboratories were then inspected.

6*th May* 1949

Annual General Meeting, at the Royal Institution, Albermarle Street, London W.1. The President, Professor G. I. Finch, was in the Chair.

The Minutes of the Annual General Meeting held on 5th May 1948 were read and confirmed.

The Reports of the Council and the Honorary Treasurer and the Annual Accounts for 1948 were adopted.

The Officers and Council for 1949–50 were elected.

Votes of thanks were recorded to the retiring President, Officers and Members of Committees; to the Rector and Governing Body of Imperial College; the Director of the Science Museum; the Managers of the Royal Institution and the Royal Commission for the Exhibition.

6*th May* 1949

Science Meeting, at the Royal Institution, Albermarle Street, London, W.1. The President, Professor G. I. Finch, was in the Chair.

The following were elected to Fellowship, the first three being transferred from Student Membership: Jerzy Adam, Michael Julian Maurice Bernal, Stuart Astley Young, Arnold Maurice Dobson, Alan Sayed Farghaly, Frederick Charles Frank, Marjorie Elsie Pillow, Edmund James Pryor, John Douglas Swift, Harold William Taylor, Cyril Stanley Watt, Maurice Stafford Willis.

Prizes and Certificates awarded in the recent Craftsmanship and Draughtsmanship Competition were presented.

The Presidential Address was delivered by Professor G. I. Finch, whose subject was "Steam in the Ring Discharge".

11*th May* 1949

The twenty-second meeting of THE LOW TEMPERATURE GROUP, at the Science Museum, London S.W.7. Professor F. E. Simon was in the Chair.

A discussion on "The Use of Thermodynamic Diagrams in Industry" was introduced by D. M. Newitt.

13*th May* 1949

The eighth Annual General Meeting of THE OPTICAL GROUP, at Imperial College, London S.W.7. Professor L. C. Martin was in the Chair.

The Minutes of the seventh Annual General Meeting were read and confirmed.

The Report of the Committee for 1948–49 was presented.

The Officers and Committee for 1949–50 were elected.

Votes of thanks were given.

13*th May* 1949

The thirty-sixth meeting of THE OPTICAL GROUP, at Imperial College, London S.W.7. Professor L. C. Martin was in the Chair.

The following paper was read :

" Notes on the Designing of Aspherical Magnifiers for Binocular Vision ", by C. E. Coulman and G. R. Petrie.

A lecture was given by M. André Maréchal of the Institut d'Optique.

20*th May* 1949

The seventeenth meeting of THE ACOUSTICS GROUP, at the Royal College of Organists, London S.W.7. Mr. H. L. Kirke was in the Chair.

The following paper was read and discussed :

" The Development of a new Electronic Organ ", by L. E. A. Bourne.

A demonstration was given.

2*nd June* 1949

Science Meeting, at the Science Museum, London S.W.7. The President, Professor S. Chapman, was in the Chair.

It was announced that Council had elected the following to Student Membership : David Spence Campbell, Reginald George Harlow, Roger George Jarvis, Derek Raynor, John Albert Bennett, Thomas Hamilton Braid, Norman Daniel Cowell, Kathleen Marjoria Gartwick, Michael Samuel Kisch.

The following were elected to Fellowship, the first two being transferred from Student Membership : Fritz K. Bowers, Cyril Scott, Frank William Cuckow, Antonius Mathias Johannes Friedrich Michels, Alexander John Moncrieff-Yeates, Leslie Walter Phipps, Walter Phipps, Denis Edwin Piper, Leonard Alfred Sayce, Harold Smith.

The twenty-sixth Duddell Medal, Prize and Certificate were presented to Dr. E. H. Land (Polaroid Corporation, Cambridge, Massachusetts), in recognition of his work on polarizing materials.

The twenty-sixth Duddell Lecture was then delivered by Dr. Land under the general heading of " A Colour Translating Ultra-Violet Microscope ".

10*th June* 1949

Science Meeting, at the Science Museum, London S.W.7. The President, Professor S. Chapman, was in the Chair.

The 1949 Thomas Young Oration was delivered by Mr. T. Smith, M.A., F.R.S., whose subject was " The Contributions of Thomas Young to Geometric Optics, and their Application to Present-day Questions ".

11*th June* 1949

The thirty-third meeting of THE OPTICAL GROUP, at Imperial College, London S.W.7. Professor L. C. Martin was in the Chair.

The following papers were read and discussed :

" The Computation of Large Numerical Aperture Telescope Objectives ", by T. Smith;

" The Boundary Wave Theory of Image Formation ", by L. C. Martin.

15*th June* 1949

The forty-sixth meeting of THE COLOUR GROUP, at the Institute of Ophthalmology, London, W.C.1. Dr. W. S. Stiles was in the Chair.

The following paper was read and discussed :

" The History of Artists' Pigments ", by H. J. Plenderleith.

14–16*th July* 1949

Science Meeting, at the Cavendish Laboratory, Cambridge. In the absence of the President, the meeting was opened by Professor G. I. Finch.

It was announced that Council had elected the following to Student Membership : John Robert Gabriel, Frederick John Hiorns, Bruce Sween Liley, John Alexander McDonnell.

The following were elected to Fellowship, the first two being transferred from Student Membership : Joan Edwards, William Leslie Wilcock, John Raymond Drabble, Oliver William Humphreys, Kamal Mikhail Matta, Clifford Charles McMahon, Margarita Eileen Monk-Jones, John Maurice McLean Pinkerton, Sidney Joseph Wyard.

Papers were read under the following headings :

The Regular Behaviour of Long and very Long Waves returned from the Ionosphere :

" The Regular Behaviour of Long and very Long Waves returned from the Ionosphere ", by J. A. Ratcliffe;

" Very Low Frequency Propagation ", by S. B. Smith and K. W. Tremellen;

" The Effects of Sky-Wave on the Planning of Navigational Aids using Frequencies in the 70–130 kc/s. Band ", by W. T. Sanderson;

" The Characteristics of Low-Frequency Radio Waves reflected from the Ionosphere, with particular reference to Radio Aids to Navigation ", by C. Williams;

" Measurements on Long and very Long Waves ", by R. N. Bracewell.

The Regular Behaviour of Medium and Short Waves :

" The Application of Ionospheric Data to Short-Wave Transmission Problems ", by W. J. G. Beynon;

" (P′, f) Records at Spitsbergen ", by A. B. Whatman.

The Irregular Behaviour associated with Solar Events :

" Irregular Behaviour of the Ionosphere associated with Solar Events ", by W. R. Piggott;

" Some Work at Cambridge on Radio Fade-outs ", by K. Weekes;

" Les renforcements brusques des ondes très longues ", by R. Bureau.

The Formation of Ionized Regions :

" The Formation of Ionized Regions ", by K. Weekes;

" Theoretical Considerations regarding the Formation of the Ionized Layers ", by D. R. Bates and M. J. Seaton.

Irregularities in the Horizontal Plane in the Ionosphere :

" Irregularities in the Horizontal Plane in Region E of the Ionosphere ", by J. W. Findlay;

" Meteor Ionization in the Upper Atmosphere ", by A. C. B. Lovell;

" Scattering of Radio Waves from Region E ", by G. Millington;

" The Variations in Direction of Arrival of High-Frequency Radio Waves ", by W. Ross;

" Diffusion des echoes su voisinage des fréquences critiques de F2 ", by R. Rivault.

REPORT OF COUNCIL FOR THE YEAR ENDED 31ST DECEMBER 1948

INTRODUCTORY AND GENERAL

1948 may in general be considered a satisfactory year for the Society. The membership has again risen considerably, the increase of the Fellows' annual subscription from two to three guineas having produced no serious losses. The financial position has improved, though publication costs continue to rise; the balance is still rather precarious, but steps have been taken which, it is hoped, will result in a further improvement in 1949.

The number of papers suitable for the *Proceedings* has so much increased that substantial changes in policy were necessary if undesirable delays in publication were to be avoided; it was therefore decided to divide the *Proceedings* into two Sections, A and B, each to be issued in monthly parts.

At the Annual General Meeting, Professor A. O. Rankine, who had been acting as Honorary Business Secretary, was succeeded by Mr. C. G. Wynne.

The continued generosity of the Royal Commission for the Exhibition of 1851 in providing accommodation for the Society's headquarters at 1 Lowther Gardens is once more gratefully acknowledged.

The Council again records the cordial thanks of the Society to the Rector and Governing Body of Imperial College and Professors Sir George Thomson and H. V. A. Briscoe for the great privilege of holding the Exhibition in the Physics and Inorganic Chemistry Departments of the College. For the use of the Lecture Theatres for Science Meetings of the Society and its four Groups the Council thanks the various bodies who gave them hospitality, in particular Sir George Thomson, Head of the Physics Department of Imperial College, the Director of the Science Museum, and the Managers of the Royal Institution.

MEETINGS

The Annual General Meeting was held at the Royal Institution on 5th May. Reports of the Council and the Treasurer and the Accounts and Balance Sheet for 1947 were presented and adopted, and Officers and Council for 1948–49 elected.

Three Extraordinary General Meetings were held during the year. The first, on 5th May, when Professor Ernest Orlando Lawrence was elected to Honorary Fellowship of the Society. The second, on 5th November, was held to consider the proposed division of the *Proceedings*. A Resolution was adopted that the *Proceedings* be issued in two Sections, A and B, and that each Fellow and Student Member be entitled to receive either Section A or Section B on payment of the ordinary current Annual Subscription, and to receive both Sections of the *Proceedings* on payment of an additional annual subscription to be determined by Council. At the third, on 3rd December, an alteration to Article 44 was approved, viz., that Student Members be entitled to a copy of all publications issued by the Society upon such terms as the Council or a General Meeting of the Society may from time to time fix.

A two-day summer meeting at the Clarendon Laboratory, Oxford, was devoted to microwave spectroscopy, and a full-day meeting at the Research Department of Metropolitan-Vickers Electrical Co. Ltd., Manchester, in December to surface structure and electrical properties of semiconductors. At one of the nine meetings held in London the Society was delighted to welcome one of its Honorary Fellows, Professor R. W. Wood, who lectured on spontaneous deformation of crystals.

MEMORIAL LECTURES AND AWARDS

GUTHRIE LECTURE

The 32nd Guthrie Lecture was delivered at the Science Museum on 4th June by Sir George Thomson, who took as his subject "The Growth of Crystals".

Charles Vernon Boys Prize

The 4th (1948) Prize was presented to Professor S. Tolansky at the Science Museum on 8th October, who delivered a discourse on his work entitled "Current Investigations with Multiple-Beam Interferometry".

Holweck Prize and Medal

The 3rd (1948) award of the Holweck Prize of the Physical Society and Holweck Medal of the Société Française de Physique was to Professor Y. Rocard. The presentation took place at the Royal Institution on 5th May when Professor Rocard delivered a Holweck Discourse on "Sur les Conditions D'Auto-Oscillation des Systèmes Vibrantes".

EXHIBITION OF SCIENTIFIC INSTRUMENTS AND APPARATUS

The 32nd Exhibition was held at Imperial College on 6th to 9th April. The attendance was higher than in 1947 (about 9,400 excluding holders of members' and exhibitors' passes). The Catalogue was available in good time, and all orders were fulfilled before the opening of the Exhibition.

PUBLICATIONS

Proceedings

During 1948 a start has been made in decreasing the period which elapses between the time of submission of a paper for publication and its appearance in print. This has been made possible in part by the increase in paper allocated to the *Proceedings* and in part by the raising of the standard of presentation required for papers accepted for publication. The institution of "Letters to the Editor" has met with approbation and is now a regular feature of the *Proceedings*. These letters are not intended to be substitutes for detailed publication of completed work, but for preliminary announcement of the results where these may be of importance even without details of the methods, or of proposals for work to be undertaken later, or they may give short outlines of proposed new methods of attack, free for others to take up. It is not desired in general that they should be the sole medium of publication of slight researches which the author judges to be unworthy of longer publication.

In order further to expedite publication, from January 1949 the *Proceedings* is to appear monthly in two sections. It will be recalled that proposals for establishing a journal of Applied Physics had been considered and rejected. It was next proposed that the *Proceedings* should be separated into papers which deal with pure physics, and others with technological physics, but examination showed the impracticability of this mode of division. It led in particular to the disadvantage that papers on a given subject—say the motion of electrons in a field—would be found in both parts, according to the point of view adopted in the treatment. It was felt that workers would prefer all papers on a given field to be in one part, whether they were written with applications in mind or not. In consequence, it has been decided that Section A shall cover atomic and sub-atomic physics, including such subjects as crystal structure, quantum mechanics and spectra, whilst Section B deals with macroscopic physics, including such subjects as acoustics, optical design and radio.

Each member of the Society receives one part, at his choice, and may purchase the other at a reduced price. The cost of supplying both parts to all members would have involved raising the subscription to more than 4 guineas, and was unacceptable to the General Meeting held on 5 November.

Reports on Progress in Physics

Volume **11** (1946–47) was published in July 1948 and is in great demand. Some delay was experienced in despatching of orders because of the difficulty of obtaining the standard green cloth for binding. There is a long waiting list for some earlier issues of the *Reports*, viz., Volumes **1–3** and **5–9**, which are out of print. The Society is anxious to buy second-hand copies of these Volumes.

Volume **12** (1948–49) is in active preparation and should be published during the summer of 1949.

Special Reports

During the year the publication of the following reports was completed: *Report on Colour Terminology*, prepared by a Sub-Committee of the Colour Group of the Society; *The Strength of Solids*, a report of a summer conference held at the H. H. Wills Physical Laboratory of the University of Bristol in July 1947; *The Emission Spectra of the Night Sky and Aurorae*, a report of a conference arranged under the auspices of the Gassiot Committee of the Royal Society.

In general the sales of Special Reports are disappointing, and the Council of the Society has decided that in future the production of such Reports shall be kept to a minimum. There will, however, be published two reports of Symposia of the Acoustics Group, arrangements for which are already in hand.

Science Abstracts

Physics Abstracts (Section A of *Science Abstracts*), which is issued as part of the Fellowship subscription, continues to increase markedly in size and cost, but the Society has decided to continue its issue to Fellows as part of the subscription at present.

REPRESENTATION ON OTHER BODIES

The following appointments of representatives in 1948 are reported:—

National Committee for Crystallography: Dr. H. Wilman.

Journal of Scientific Instruments, Advisory Committee: Mr. J. H. Awbery, Professor G. I. Finch, Dr. H. H. Hopkins, Mr. A. T. Pickles, Mr. E. W. H. Selwyn, Dr. A. C. Stickland, Dr. W. S. Stiles, Dr. W. D. Wright.

British Standards Institution Sub-Committee on Temperature Measurement: Dr. E. Griffiths.

Royal Society National Committee for Physics: Dr. A. C. Menzies.

Royal Society National Committee for Scientific Radio: Dr. W. J. G. Beynon.

Faraday Society, Colloid and Biophysics Committee: Professor J. T. Randall.

Organization Committee for Symposium on Metallurgical Applications of the Electron Microscope: Dr. A. G. Quarrell.

British Standards Institution—Committee on Nomenclature and Symbols: Dr. L. Hartshorn.

Board of the Institute of Physics: Dr. H. H. Hopkins, Dr. A. C. Menzies.

British Standards Institution—Acoustics Industry Committee: Mr. H. L. Kirke.

Science Abstracts Committee of Management: Mr. J. H. Awbery, Dr. A. G. Gaydon, Dr. A. C. Menzies, Dr. D. Roaf.

OBITUARY

The Council records with great regret the deaths of the following: Dr. Irena Gimpel, Mr. T. H. Littlewood, Mr. G. L. Overton, Sir Clifford Paterson, Professor A. F. C. Pollard, Dr. J. H. Shaxby, Mr. E. W. Smith, Professor S. W. J. Smith (*Fellows*); and Miss Margaret Weiss (*Student Member*).

MEMBERSHIP

As the following tables show, the membership of the Society continues to increase.

Roll of Membership		Hon. Fellows	*Ex-officio* Fellows	Fellows	Student Members	Total
Totals, 31st Dec. 1947		8	4	1469	384*	1865*
Changes during 1948	Newly elected	1		86 } 125	126	
	Transferred			39 }	39 } 67	
	Deceased			7 } 65	1 }	
	Resigned			56 }	27 }	
	Lapsed			2 }		
	Net increase	1		60	59	120
Totals, 31st Dec. 1948		9	4	1529	443	1985

* Amended figure.

The following is a summary of the membership during the past eight years :—

Year	1941	1942	1943	1944	1945	1946	1947	1948
Newly elected Student Members	51	96	74	52	68	53	102	126
Transfers from Student Membership	13	20	22	23	52	46	33	39
Newly elected Fellows	28	57	42	36	56	139	126	87
Net increase in Fellowship	6	57	36	55	80	165	137	60
Net increase in total Membership	37	140	73	63	75	160	179	120

GROUPS

Colour Group

The Group held its eighth Annual General Meeting for the presentation of the Committee's Report on the work of the Group in 1947–48. Mr. J. G. Holmes was re-elected as Chairman of the Group, Mr. R. G. Horner was elected as Honorary Secretary, and the Committee for 1948–49 was elected.

Nine Science Meetings, brief particulars of which are given in the *Proceedings* *, were held during the year. One of them, on 13th October at Northampton Polytechnic, was held as a joint meeting with the Optical Group.

The Report of the Sub-Committee on Colour Terminology was published as a companion to the earlier Report on " Defective Colour Vision in Industry ".

Optical Group

At the Seventh Annual General Meeting, which was held at Imperial College on 30th April 1948, Professor L. C. Martin was re-elected as Chairman of the Group, Mr. E. W. H. Selwyn was re-elected as Honorary Secretary, and the Committee for 1948–49 was elected.

Five Science Meetings, brief particulars of which are given in the *Proceedings* *, were held during the year. One of them, on 13th October at Northampton Polytechnic, was held as a joint meeting with the Colour Group.

Papers read at the meetings of the Group have been published in the *Proceedings* † and in the *Photographic Journal*.

Low Temperature Group

The Third Annual General Meeting of the Group was held at the Science Museum on 17th December 1948, when Professor F. E. Simon and Professor D. M. Newitt were elected as Chairman and Vice-President respectively. Dr. G. G. Haselden was re-elected as Honorary Secretary and the Committee for 1948–49 was elected.

There were six Science Meetings held during the year, brief particulars of which are given in the *Proceedings* *. The one held on 13th February 1948 was a joint meeting with the Institution of Chemical Engineers at the Institution of Civil Engineers, and the one held on 5th April was a joint meeting with the Institute of Refrigeration.

Acoustics Group

The Second Annual General Meeting of the Group took place at the Royal Institute of British Architects on 8th April, when Mr. H. L. Kirke and Dr. A. Wood were re-elected Chairman and Vice-Chairman respectively, Mr. W. A. Allen and Mr. A. T. Pickles were re-elected as Joint Honorary Secretaries, and the Committee for 1948–49 was elected.

Nine Science Meetings, brief particulars of which are given in the *Proceedings* *, were held during the year.

Membership

The membership of the four Groups on 31st December 1948 was as follows :—

	Colour	Optical	Low Temperature	Acoustics
Members of the Physical Society	113	189	45	69
Members of participating bodies	62	80	35	146
Members of subscribing firms and Societies	33	75	—	—
Other members	15	19	10	50
	223	363	90	265

* *Proc. Phys. Soc.*, 1948, **61**, vi–xv. † *Proc. Phys. Soc.*, 1948, **61**, 489, 494.

REPORT OF THE HONORARY TREASURER FOR THE YEAR ENDED 31ST DECEMBER 1948

The accounts have been prepared on the same lines as last year, and show an excess of income over expenditure of £1067 4*s.* 2*d.*, against a deficit in 1947 of £1992 7*s.* 8*d.*

All items of expenditure show increases due to the increased activities of the Society.

On the income side the increase in the rate of Fellows' subscriptions from two to three guineas has produced a considerably greater revenue, while receipts from the sale of publications show a general all-round improvement.

A publication grant of £1500 from the Royal Society (against grants totalling £1400 last year) and also a legacy of £500 from the will of the late William Lucas (Fellow 1891) are gratefully acknowledged.

For the first time in recent years the stocks of publications on hand at the opening and closing of the year have been included, thereby giving a more accurate indication of the operations in connection with publications.

Dividends and interest show a decrease, which is accounted for by the fact that during 1947 the Society sold £1000 3% Savings Bonds, while £400 Lancaster Corporation Stock was redeemed and the proceeds not re-invested. There is also a reduction in income due to nationalization of the railways. No change has taken place in the Society's investments during the year.

(Signed) H. SHAW,
Honorary Treasurer.

25*th February* 1949.

SPECIAL FUNDS

W. F. STANLEY TRUST FUND

	£	s.	d.		£	s.
Carried to Balance Sheet	259	0	0	£338 19*s.* 1*d.* British Transport Stock 1978/88	259	0
	£259	0	0		£259	0

DUDDELL MEMORIAL TRUST FUND

CAPITAL

	£	s.	d.		£	s.
Carried to Balance Sheet	374	0	0	£400 3½% War Loan Inscribed "B" Account	374	0

REVENUE

	£	s.	d.		£	s.
Prize	20	0	0	Balance on 31st December 1947	13	19
Certificate	1	0	0	Interest on War Loan	14	0
Balance carried to Balance Sheet	6	19	11			
	£27	19	11		£27	19

SPECIAL FUNDS (*contd.*)

CHARLES CHREE MEDAL AND PRIZE FUND

CAPITAL

	£ s. d.		£ s. d.
Balance carried to Balance Sheet	1866 10 0	£784 4% Funding Stock	839 0 0
		£1500 2½% Consols	1027 10 0
	1866 10 0		1866 10 0

REVENUE

	£ s. d.		£ s. d.
Balance carried to Balance Sheet	86 11 10	Balance on 31 December 1947	17 14 8
		Interest on Investments	68 17 2
	£86 11 10		£86 11 10

CHARLES VERNON BOYS PRIZE FUND

CAPITAL

	£ s. d.		£ s. d.
Balance carried to Balance Sheet	900 0 0	£1132 16*s.* 10*d.* 2½% Consols "B" Account	900 0 0

REVENUE

	£ s. d.		£ s. d.
Balance on 31 December 1947	15 10 3	Interest on Investment	28 6 4
Prize	26 5 0	Balance carried to Balance Sheet	14 8 11
Certificate	1 0 0		
	£42 15 3		£42 15 3

HOLWECK PRIZE FUND

CAPITAL

	£ s. d.		£ s. d
Balance carried to Balance Sheet	575 0 0	£575 3% Defence Bonds	575 0 0

REVENUE

	£ s. d.		£ s. d.
Prize and Certificate	107 12 6	Balance on 31st December 1947	8 13 8
Expenses	66 19 6	British Council contribution to expenses	25 0 0
Balance carried to Balance Sheet	4 6 8	Interest on Investments	20 5 0
		Sale of Investment	100 0 0
		Grant from General Fund	25 0 0
	£178 18 8		£178 18 8

ADDENBROOKE BEQUEST

CAPITAL

	£ s. d.		£ s. d.
Balance carried to Balance Sheet	337 0 0	£384 6*s.* 7*d.* 2½% Consols "D" Account	337 0 0

REVENUE

	£ s. d.		£ s. d.
Balance carried to Balance Sheet	26 5 0	Balance on 31st December 1947	16 13 0
		Interest on Investments	9 12 0
	£26 5 0		£26 5 0

LIFE COMPOSITION FUND ON 31ST DECEMBER 1948

	£ s. d.
16 Fellows paid £10	160 0 0
1 Fellow paid £15	15 0 0
1 Fellow paid £15 15*s.* 0*d.*	15 15 0
17 Fellows paid £21	357 0 0
1 Fellow paid £25 4*s.* 0*d.*	25 4 0
1 Fellow paid £26 5*s.* 0*d.*	26 5 0
56 Fellows paid £31 10*s.* 0*d.*	1764 0 0
1 Fellow paid £33 12*s.* 0*d.*	33 12 0
1 Fellow paid £67 14*s.* 6*d.*	67 14 6
	£2464 10 6

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER 1948

1947 £	Expenditure	£ s. d.	£ s. d.
	To		
1140	"Science Abstracts"		788 5 0
	Publications:		
	Stock 1st January 1948	6700 0 0	
4769	"Proceedings"	6861 14 4	
1205	"Reports on Progress in Physics"	2198 5 7	
2796	Special Publications	1277 8 7	
			17037 8 6
860	Postage on Publications and General Correspondence		935 15 10
402	Agenda Papers, Notices and Expenses at Meetings		397 3 3
26	Honoraria to Special Lecturers		26 5 0
3451	Secretarial and Clerical Assistance and Office Expenses		4415 3 0
25	Grant to Holweck Prize Fund		25 0 0
97	Furniture and Office Equipment		133 2 6
2793	Exhibitions:—Expenses (excluding office and overhead)		3936 12 10
	Balance, being excess of Income over Expenditure, carried to General Fund		1067 14 2
£17,504			£28,762 10 1

1947 £	Income	£ s. d.	£ s. d.
	By		
	Subscriptions:		
110	Entrance Fees	88 4 0	
2752	Fellows	4428 7 11	
211	Student Members	353 14 6	
31	Colour Group	34 17 0	
61	Optical Group	96 2 6	
12	Low Temperature Group	63 1 0	
47	Acoustics Group	144 14 0	
200	"Science Abstracts"	281 16 4	
			5490 17 3
	Publications:		
2788	"Proceedings"	2878 6 6	
1046	"Reports on Progress in Physics"	1939 7 7	
997	Advertisements in "Proceedings"	1432 17 3	
579	Special Publications	1833 0 3	
639	Cambridge Conference, contribution towards cost of Report	– – –	
1400	Grants from Royal Society	1500 0 0	
—*	Stock of Publications 31st December 1948	7500 0 0	
			17083 11 7
328	Interest on Investments		273 2 2
41	Transfer from Life Composition Fund of amounts paid by Fellows now deceased		62 10 0
4270	Exhibitions:—Receipts		5852 9 1
1992	Balance, being excess of Expenditure over Income, carried to General Fund		– – –
£17,504			£28,762 10 1

* The opening stock was not included in the Income and Expenditure Account last year but was taken direct to the General Fund.

BALANCE SHEET AS ON 31st DECEMBER 1948

Liabilities	£ s. d.	£ s. d.
Sundry Creditors		1966 12 7
Life Compositions:		
As on 31st December 1947	2443 11 0	
Add Payments during year	83 9 6	
	2527 0 6	
Less Transfer to Income and Expenditure Account	62 10 0	
		2464 10 6
Subscriptions:		
Members	587 9 11	
Publications	2391 6 8	
		2978 16 7
Special Funds:		
W. F. Stanley Trust Fund	259 0 0	
Duddell Memorial Trust Fund	380 19 11	
Charles Chree Medal and Prize Fund	1953 1 10	
Charles Vernon Boys Prize Fund	885 11 1	
Holweck Prize Fund	579 6 8	
Addenbrooke Bequest	363 5 0	
		4421 4 6
General Fund:		
As on 31st December 1947	11013 1 5	
Add Lucas Legacy	500 0 0	
Balance of Income and Expenditure Account	1067 14 2	
		12580 15 7
		£24,411 19 9

We have audited the above Balance sheet and have obtained all the information and explanations we have required. We have verified the bank balances and the Investments. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Society's affairs according to the best of our information and the explanations given to us and as shown by the books of the Society.

KNOX, CROPPER & Co.,
Chartered Accountants

Spencer House, South Place, E.C.2.
25th February 1949.

Assets	£ s. d.	£ s. d.
Investments at market value on 31st December 1939 or cost:—		
W. F. Stanley Trust Fund:		
£338 19 1 3% British Transport Stock 1977/88		259 0 0
Duddell Memorial Fund:		
£400 3½% War Stock		374 0 0
Charles Chree Medal and Prize Fund:		
£784 4% Funding Stock	839 0 0	
£1500 2½% Consols	1027 10 0	
		1866 10 0
Charles Vernon Boys Prize Fund:		
£1132 16*s.* 10*d.* 2½% Consols		900 0 0
Holweck Prize Fund:		
£575 3% Defence Bonds		575 0 0
Addenbrooke Bequest:		
£384 6*s.* 7*d.* 2½% Consols		337 0 0
General Fund:		
£2100 2½% Consols	1437 10 0	
£1750 3½% War Stock	1636 0 0	
£500 4% Funding Stock	535 0 0	
£2300 3% Defence Bonds	2300 0 0	
£1919 16*s.* 3*d.* 3% British Transport Stock 1977/88	1533 0 0	
		7441 10 5
		11,753 0 0
(Market value on 31st December 1948: £12,836.)		
Dividends due on Investments		64 1 0
Inland Revenue—Income Tax recoverable		16 12 10
Subscriptions due		151 11 6
Sundry Debtors		1013 16 8
Stock of Paper and Binding Material	1480 2 9	
Publications	7500 0 0	
		8980 2 9
Cash at Bank: Current Account	2255 2 10	
Deposit Account	95 15 11	
Cash in hand	81 15 10	
		2432 14 7
		£24,411 19 9